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Bean Leaf Beetle Mortality Predictions

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Abstract
Bean leaf beetle adults (Photo 1) are susceptible to cold weather and most will die when the air temperature falls below 14°F (-10°C). However, they have adapted to winter by protecting themselves under plant debris and loose soil. Each spring, adult beetles emerge from overwintering habitat and migrate to available host plants, such as alfalfa, tick trefoil, and various clovers. As the season progresses, bean leaf beetles move to more preferred hosts, like soybean. While initial adult activity can begin well before soybean emergence, peak abundance often coincides with early vegetative soybean growth.

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Photo 1. Adult bean leaf beetle. Photo by Winston Beck.

An overwintering survival model was developed by Lam and Pedigo from Iowa State University in 2000, and is helpful for predicting winter mortality based on accumulating subfreezing temperatures. Predicted mortality rates in Iowa are variable for the 2016-2017

winter, ranging from 43-72 percent (Figure 1). Northern Iowa experienced colder temperatures, and more than half of the bean leaf beetle adults are not expected to survive there.

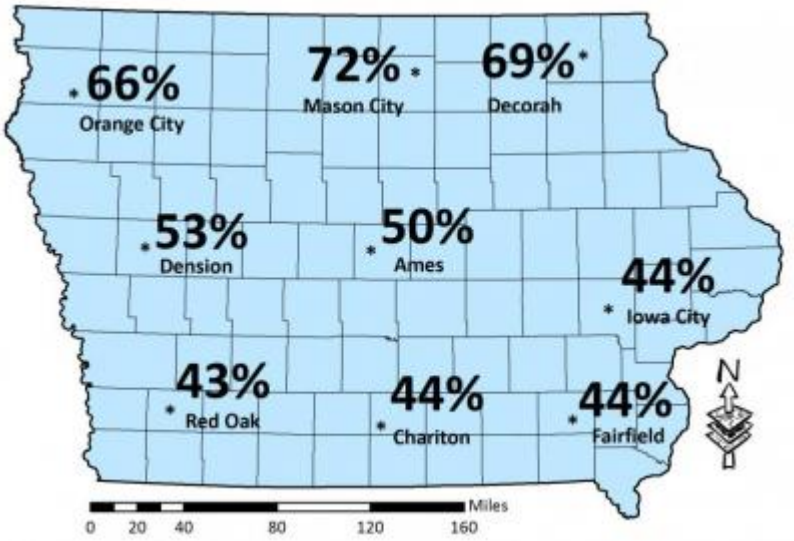

Figure 1. Predicted overwintering mortality of bean leaf beetle based on accumulated subfreezing temperatures during the winter (1 October 2016 – April 2017).

The statewide-predicted mortality from the 2013-2014 winter was the highest since Marlin Rice started tracking these data in 1989. The last two winters have generally been milder than average. The average mortality in central Iowa over the last 28 years is 71 percent; however, approximately 50 percent of adults are predicted to have died last winter (Figure 2). It is important to remember insulating snow cover and crop residue can help protect bean leaf beetle from harsh air temperatures. Fluctuating temperatures can negatively influence spring populations.

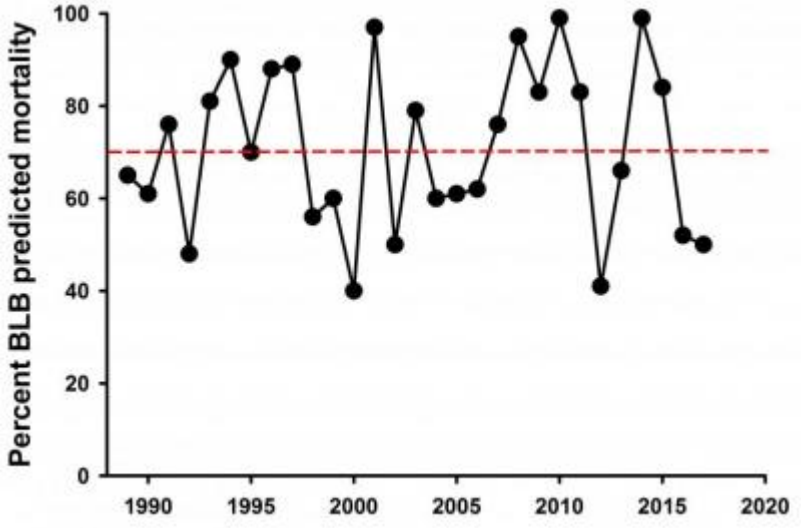

Figure 2. Predicted bean leaf beetle mortality by year for central Iowa; the red line indicates the average mortality rate (71%).

Overwintering beetle populations are expected to be moderate this year, consider scouting soybean fields, especially in southern Iowa, if:

1. Soybean is planted near alfalfa fields or if the field has the first-emerging plants in the area. Overwintering adults are strongly attracted to soybean and will move into fields with emerging plants.

2. Fields are planted to food-grade soybean production or are seed fields where reductions in yield and seed quality can be significant.

3. Fields have a history of bean pod mottle virus.

Bean leaf beetles are easily disturbed and will drop from plants and seek shelter in soil cracks or under debris. Sampling early in the season requires you to be "sneaky" to estimate actual densities. Although overwintering beetles rarely cause economic damage, their presence may be an indicator of building first and second generations later in the season. To learn more about managing bean leaf beetle and bean pod mottle virus, click here.

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